were less opaque, dark chocolate-brown in color and with the tubercles clearly discernable in the unbroken epispore. The protoplasmic contents were sparse and the oil globules small and numerous. That these were not immature stages is shown by the fact that three or four weeks time produced no change in the culture.

A series of camera-lucida drawings were made of several of the abnormalities found in the culture. The typical zygospore of the species is subglobose and borne between a pair of almost equal suspensors which taper from the spore to the hyphae from which they arise and with which they are continuous. The zygospore represented at figure *b* is normal except in regard to the suspensors which are separated from their hyphae by septae and are sharply curved at the base. Figures *c* and *d* represent types of poorly developed zygospores both of which were very light brown and almost destitute of protoplasm. Figures *e* and *f* represent parthenospores. These are formed by a single gamete and are said to have the same function as the zygospores. The term "azygospore" is usually applied to these spores but with questionable propriety as, being formed without the union of gametes, either equal or unequal, they are certainly not entitled to be called zygospores. Moreover, the term azygospore is not used to designate similar structures among the zygosporic Algae, nor are equivalent spores among the oosporic Algae and Fungi referred to as "anoospores." Figure *e* represents both the gametes as having formed smooth, light colored spores, while in figure *f* but one spore was formed, the other progamete not even cutting off a gamete.

By far the most interesting of these abnormal spores is that illustrated in figure *a*. This spore has the appearance of being double in structure; but at no point were the suspensors entirely separated, although both suspensor and spore were deeply grooved. This abnormality may have been formed by the fusion of closely approximated gametes; or, as is to the mind of the author much more probable, we have here an example of fasciation in the moulds.

II. A Nematode in Hydrogera Kleinii.

While engaged in a study of the local species of *Mucorales* of Tippecanoe County, Indiana, a mass of horse dung which was covered with *Hydrogera Kleinii* (van Tiegh.) Kuntze, (*Pilobolus Kleinii* van Tiegh) was brought into the laboratory the 16th of October. The sporangiophores averaged a centimeter in height and were of a bright yellow color. The spores were large (14–20 μ)

and filled with an abundance of yellowish, granular protoplasm. The mould was of a very healthy appearance and luxuriant growth yet all attempts to germinate the discharged spores failed. The material was set to one side and no further attention given it until the first week in February when it was placed in a moist chamber where a scant growth of mould occurred. The sporangiophores were about 0.5 cm. in height and appeared white to the naked eye. Under the microscope a faint orange tint was apparent. The spores were normal in size but very light in color.

On the 15th the culture was reexamined to note the difference between the earlier and the later sporangia of the same growth. Only a few sporangia remained. Instead of the usual beautiful crystalline objects they had much the appearance of a large *Aspergillus*. Under the microscope the majority of the sporangia appeared as distorted masses of spores without trace of the sporangial membrane or of the subsporangial swelling. A single specimen was still intact, yet the subsporangial swelling was convulsed by an internal disturbance so that its form was constantly changing. It soon burst, six small worms emerged, and the sporangium took upon itself the same appearance as the others. The spores of these infested sporangia were only about 2–4 μ in size, colorless and apparently empty. They also exhibited a decided tendency to arrange themselves in chains of one or two rows of spores—a characteristic which I have not noticed in the normal spores. After the mass of spores had been washed away the effect on the sporangiophore was apparent. In escaping the worms broke the walls of the subsporangial swelling in such a way as to prevent the discharge of the sporangium and to allow the swelling to collapse somewhat, leaving the apex of the sporangiophore club-shaped.

The worms were minute, colorless, about 25–39 μ thick and 600–800 μ long. Under a high magnifying power the internal structure appeared rather distinctly and the organs could be traced with considerable satisfaction. The worms are enclosed in a transparent, colorless perisarc from which the body is entirely free. Anteriorly the worm is blunt and rather rounded with a distinct gullet. Posteriorly the perisarc is produced into a long tapering point far beyond the pointed posterior extremity of the worm. In motion the perisarc is very perceptably wrinkled but the body of the worm has no such appearance.

In Coeman's * Monographie du Genre Pilobolus (p. 49–52), we find an account of the sporangiophores of *Pilolobus crystalinus*

*. Mem. Cour. l'Acad. roy. Belg. XXX. 1861.

and *P. oedipus* being infested by a Nematode which he called *Rhabditis terricola* Duj. The form according to Coemans, is common in decaying substances and not of rare occurrence in the above named species. He cites references to previous observations upon the subject by Persoon,† Currey,‡ and Ehrenberg§. Illustrations of the worm and its work supplement the text|| and lead to the conclusion that the species under observation is identical with that studied by the older authors.

Material from this culture was sent to Dr. C. W. Stiles of the Public Health and Marine-Hospital Service for identification. He reported that only larvae could be found and as no adults developed after a considerable period of observation he concluded that the species was parasitic upon the horse.

The papers cited above contain a discussion as to the relation of the worm to the fungus but only conflicting conclusions are reached; nor have we any theory to advance to explain the occurrence of the worms within the sporangiophores of the mould.

Upper Iowa University, Fayette, Iowa.

†. Obs. Myc. 1:77. 1796.
‡. Jour. Linn. Soc. London 1:166.
§. Kuntze and Schmidt, Myk. Hefte. 2:67. 1823.
||. Pl. 11. A 19, C, D.

Microscopy Notes.

II. A Convenient Field Microscope.

By Joseph A. Martin.

The ordinary type of instrument advertised by optical companies, as a compound field microscope, such as designed to collect microscopic plants has many objections to its adoption for general use, especially because they are expensive and inconveniently constructed.

In gathering material or objects, such as algae, it is very essential for one to know whether or not the material is in favorable condition before leaving the field; for if left to be examined in the laboratory later and then found to be worthless loss of time results. On returning the following day it is not likely that one will find the